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Title: Traditional Method for Amplifier Matching for NDA Detector Systems

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Traditional Method for Amplifier Matching for NDA Detector Systems

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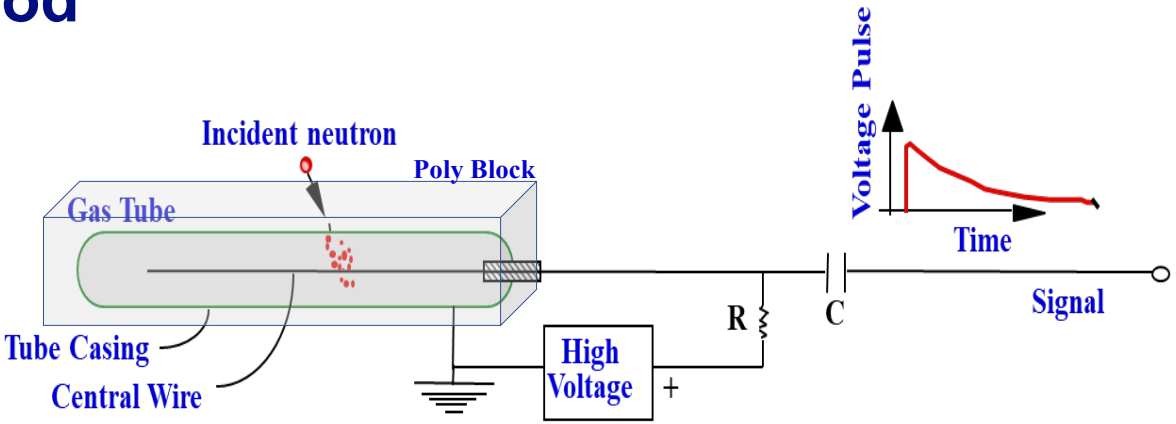
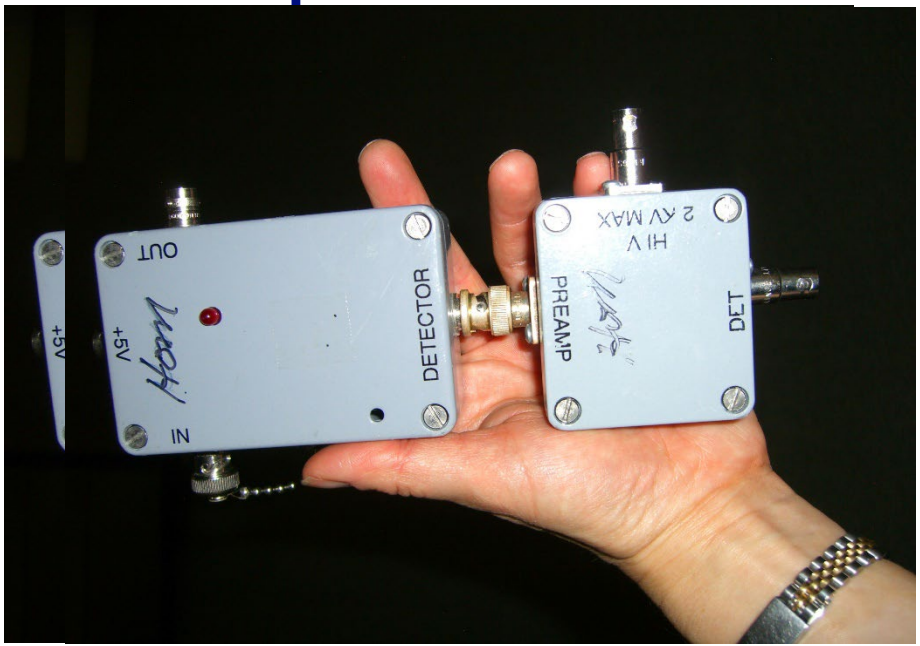
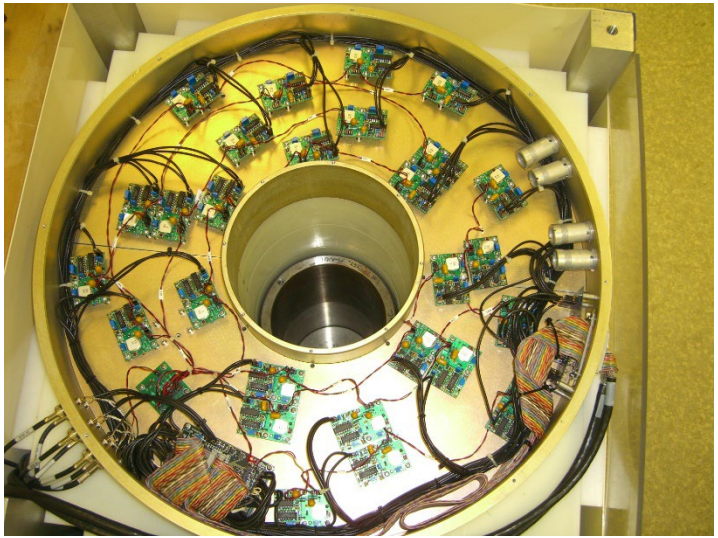
Traditional Method

- Requirements
  - Test setup
    - Poly block
    - He-3 tube
    - Amplifier
    - Cf-252 source
    - Data acquisition system (JSR-15 or AMSR-150)



Test Setup

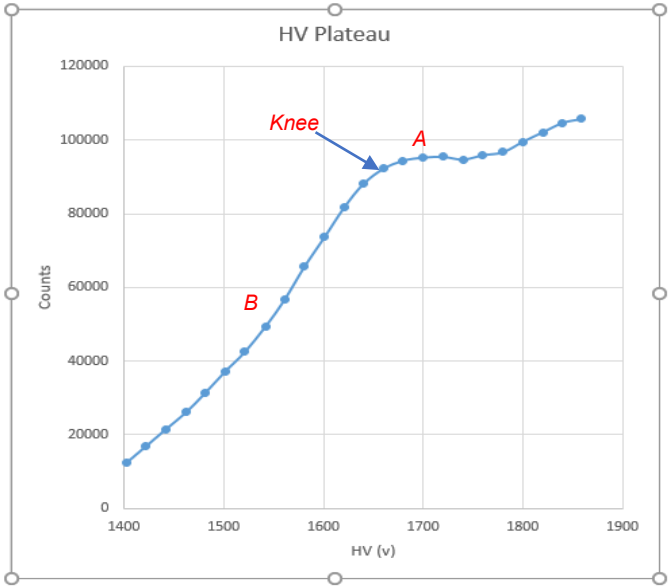




Jimmy Box containing the A111 Amptek Amplifier and High Voltage Filter (left) Or a Detector Junction Box (right)

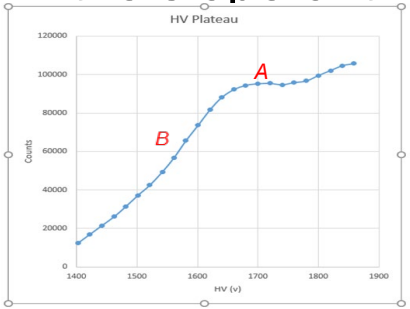
Setting up the Reference Amplifier

- Choose one of the amplifiers from the system
  - Collect a high voltage plateau
    - Make adjustments to the gain to set your operating voltage (typically 1680 or 1720 volts). The operating voltage is usually 40 volts above the knee



Setting up the Reference Amplifier

- Once the operating voltage has been determined
  - Choose a point on the plateau, point A
  - Choose a point about half way down the slope of the plateau curve, point B
  - Calculate the ratio
    - $Ratio = \frac{A}{B}$
  - The ratio should be about 2.0
  - For the subsequent amplifiers to be gain matched
    - Assemble in to the test setup
    - Set high voltage on the Shift Register to the value the corresponds to point A, collect counts



Gain Matching Subsequent Amplifiers

- Divide the counts from point A by the *Ratio*
  - The result is the expected counts at point B
- Set the high voltage to the voltage that corresponds to point B, adjust the gain on the amplifier to obtain the expected counts
- Use the values measured for A and B to calculate the ratio for this amplifier and record the ratio, and the counts of A and B on a table. The recorded ratio should with in 1% of our reference value.

Amplifier ID	Point A (1700 V)	Point B (1520 V)	Ratio $(R = \frac{A}{B})$

Gain Matching Subsequent Amplifiers

- Continue this procedure until all amplifiers have been matched
- NOTE:
  - Test set up can be the a bench top system as shown before or the detector system it self.